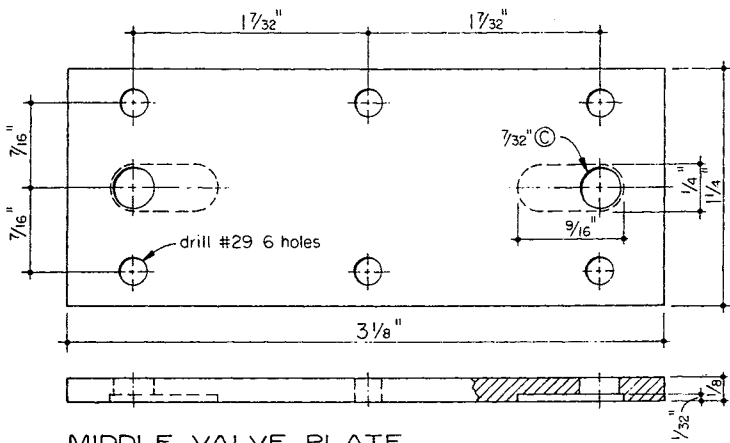
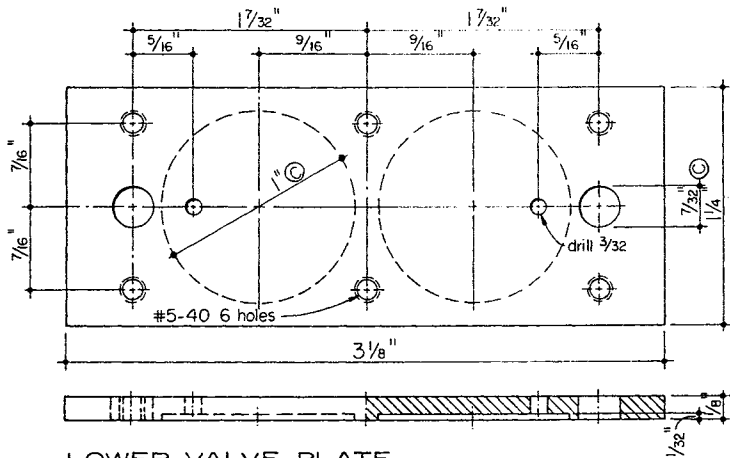


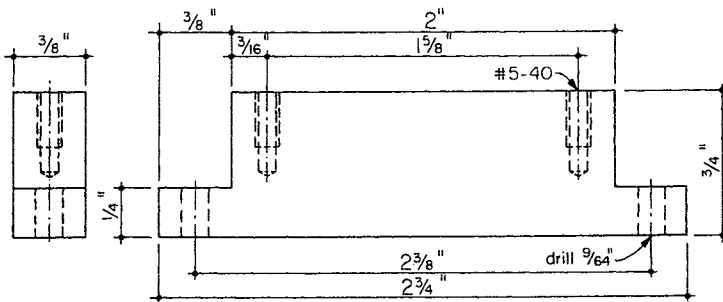
UPPER VALVE PLATE



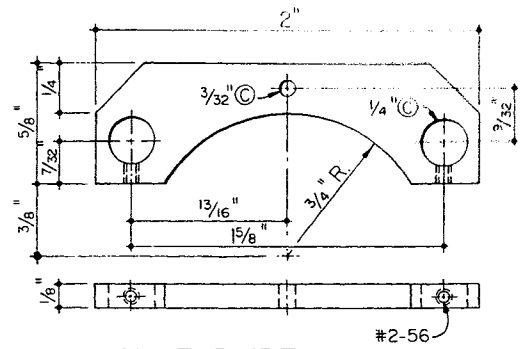
MIDDLE VALVE PLATE



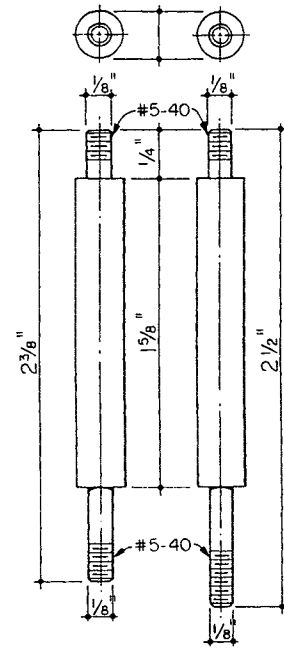
LOWER VALVE PLATE



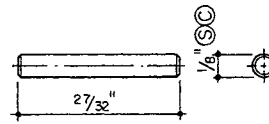
FOOT
2 Required



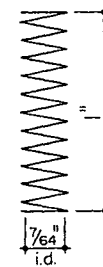
VALVE GUIDE
2 Required



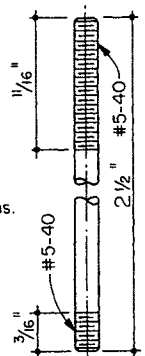
2 Req'd. 4 Req'd.
COLUMNS



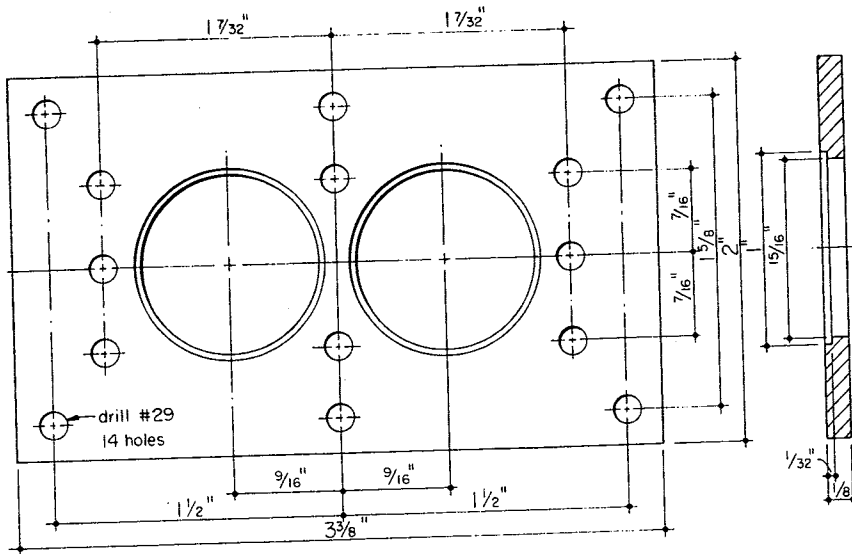
WRIST PIN
2 Required



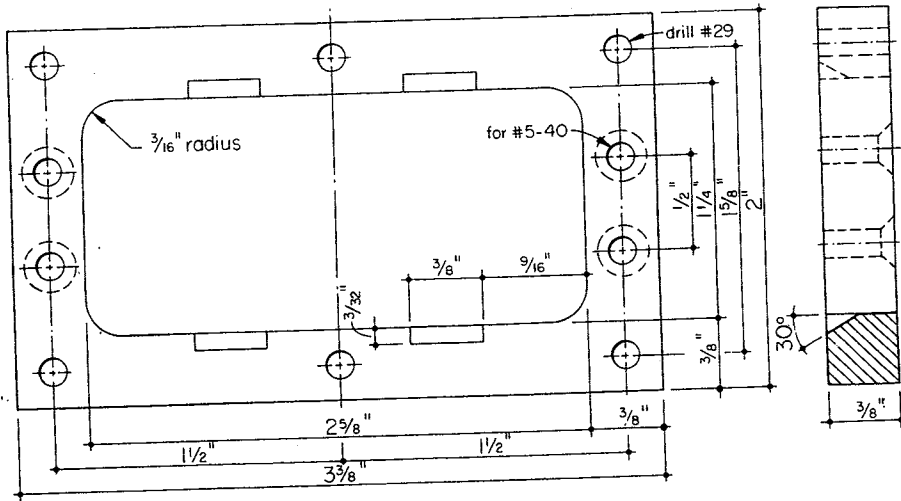
VALVE SPRING
2 Required



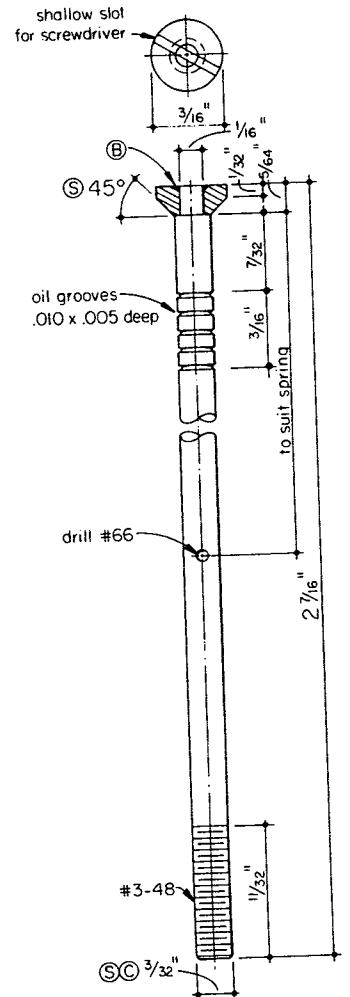
TIE ROD
6 Required



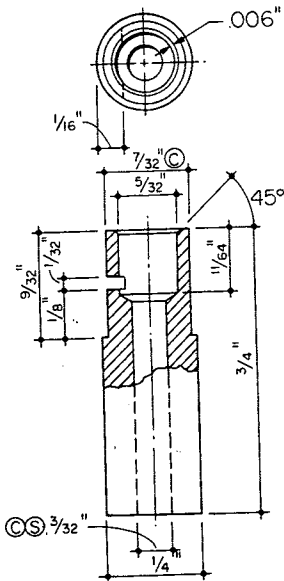
TABLE



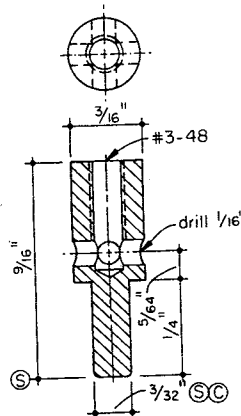
BASE



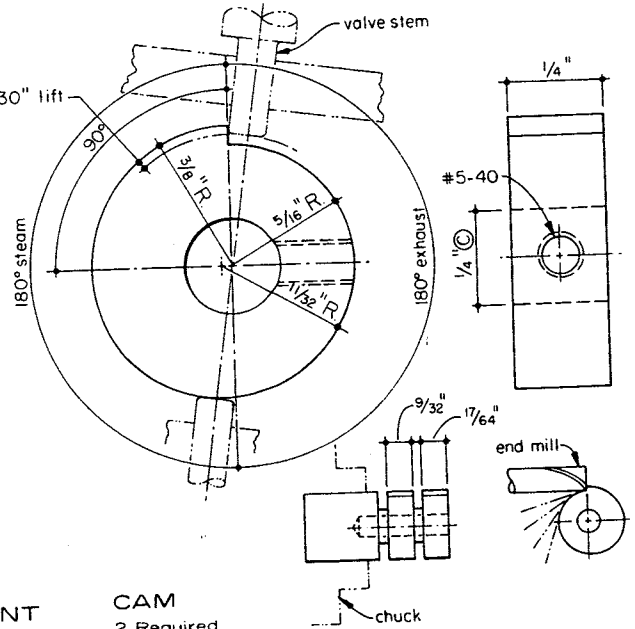
VALVE
2 Required



VALVE SEAT
2 Required



VALVE ADJUSTMENT
2 Required



CAM
2 Required

place. Dress off any raised metal on the piston surface with an oil stone.

For the **CAMS**, chuck a piece of 3/4" diameter cold finish steel about 1-1/2" long in the 4-jaw with about 7/8" projecting and center with an indicator. File lightly and polish the 3/4" diameter. Face the end and make a light center prick with a sharp tailstock center. Remove the chuck from the lathe and take to the bench and coat the end of the stock (still in the chuck) with layout dye. Carefully pick up the prick mark and make a better center with a prick punch. Scribe a 5/16" arc. Return the chuck to the lathe and bore and ream for 1/4" shaft. Make a parting cut about 17/64" from the end and another about 9/32" from the first, down to a neck diameter of about 3/8". Remove from the chuck and mount in the 3-jaw chuck on an indexing fixture. Mount a 1/4" end mill and spot at the lines for the notch as shown on the drawing. Use an indexing plate with about 36 divisions and mill successive cuts at each division. When you reach the point just before the curve starts to rise, back off at each cut so you do not lose the layout line. Remove from the mill and spot the set screws about 90° from the notch where the follower never touches. Saw the Cams off the stock and face off the three faces to 1/4" thickness on a stub arbor in the

lathe. Anchor these two Cams on a 1/2" length of close-fitting 1/4" rod, notches even and holding with the set screws. Use a filing machine and dress to the line. Be sure of a good polished surface from the setscrew around to the notch. Do this with emery cloth on a flat plate. If you do not have indexing and filing equipment, complete one Cam by carefully hand-filing to the line. Use the 1/4" rod, 1/2" long, and place the layout side of this Cam against the other blank and scribe round it. Then file that Cam to the line. Mount the two together on the stub Shaft with the two layout faces outward. Line up the notches and carefully dress and polish to the lines. If this engine has a hard-working future, case harden and polish these Cams.

The same could be said about the **VALVE ADJUSTMENT**. This piece is brass on the model shown and is a lathe job calling for fair concentricity. The cross holes make it a bit easier to tighten the lock nuts.

The **VALVE SEAT** is a turning, soldered with 430° solder into the lower Valve Plate. Alignment with the Valve Guide is important for free movement.

The **VALVES** are brass rod, close-fitting in the guides with a soldered-on head. Silver solder was used since it was thought that soft solder might

not take the pounding. After brazing, the rod was carefully chucked, centered and turned so the tapered valve surface would be concentric with the valve rod.

At assembly, apply a dab of soft grease to the Cams and lower Valve Guide. Cut out an arrow from colored adhesive tape and locate on the table to show the direction of rotation. The Cams and Valve Stems can be damaged if a vigorous boost is made in the wrong direction. A hard bump on the Cams can change the timing.

The **FLYWHEEL** on the model shown is a cast iron gear with the teeth turned off. It had a 3/4" bore which was plugged and rebored to 1/4". It is a bit clumsy, but the engine needs a fairly heavy wheel. A Flywheel can be made from 1/2" flat stock. Lay out and drill the twelve 1/8" holes and six 3/16" holes as shown. Chuck in a 4-jaw, gripping about 1/8" of the stock thickness. Turn the O.D., recess 2-1/4" x 5/32" and shaft bore. Reverse in a 3-jaw chuck, gripping on the rim I.D. and finish the O.D. and second 2-1/4" recess. Remove from the chuck and apply layout dye to one entire web face. Scribe lines tangent to the holes as shown and saw and file the spokes to shape.

You now have another fine example of the Steam Era to add to your collection.

